WHAT IS CLAIMED IS:

1. A carbon monoxide selective oxidizing catalyst, comprising:

a carrier consisting essentially of one of ferrierite and ZSM-5; and

a metal component supported on the carrier and which includes one of platinum (Pt) alone and platinum (Pt) and at least one type of transition metal, wherein

when the carbon monoxide selective oxidizing catalyst receives a supply of a hydrogen-rich gas containing carbon monoxide, the carbon monoxide selective oxidizing catalyst promotes a carbon monoxide selective oxidizing reaction that oxidizes the carbon monoxide by giving the carbon monoxide priority over hydrogen.

2. A carbon monoxide selective oxidizing catalyst according to claim 1, wherein the transition metal is at least one type of metal selected from the group consisting of iron (Fe), nickel (Ni), cobalt (Co), manganese (Mn), copper (Cu), ruthenium (Ru), chromium (Cr), palladium (Pd), rhodium (Rh), and iridium (Ir).

3. A carbon monoxide selective oxidizing catalyst according to claim 2, wherein the transition metal is iron, and a molar ratio value between a platinum content in a solution used for supporting the platinum on the carrier and an iron content in a solution used for supporting the iron on the carrier ([Pt]/[Fe]) is 1.5 to 7.5 when the carbon monoxide selective oxidizing catalyst is manufactured.

4. A carbon monoxide selective oxidizing catalyst according to claim 3, wherein the molar ratio value ([Pt]/[Fe]) is 2 to 6.

5. A carbon monoxide selective oxidizing catalyst according to claim 4, wherein the molar ratio value ([Pt]/[Fe]) is about 4.

6. A carbon monoxide selective oxidizing catalyst according to claim 1, wherein the carbon monoxide selective oxidizing catalyst is subjected to a reduction processing before being used in order to promote the carbon monoxide selective oxidizing reaction after the metal component has been supported on the carrier.

7. A carbon monoxide selective oxidizing catalyst according to claim 6, wherein the reduction processing is performed at a temperature higher than a temperature of the hydrogen-rich gas used for the carbon monoxide selective oxidizing reaction.

8. A carbon monoxide selective oxidizing catalyst according to claim 6, wherein the reduction processing is performed at 150 to 370°C.

9. A carbon monoxide concentration reduction apparatus, comprising:

a hydrogen-rich gas supply that supplies the hydrogen-rich gas;

an oxygen supply that supplies oxygen used for oxidizing the carbon monoxide;

the carbon monoxide selective oxidizing catalyst according to claim 1; and

a carbon monoxide selective oxidizing reactor that includes the carbon monoxide selective oxidizing catalyst and receives a supply of the hydrogen-rich gas and the oxygen from the hydrogen-rich gas supply and the oxygen supply, respectively, to selectively oxidize carbon monoxide contained in the hydrogen-rich gas through the carbon monoxide selective oxidizing reaction, wherein the carbon monoxide concentration reduction apparatus oxidizes the carbon monoxide contained in the hydrogen-rich gas, thereby reducing a carbon monoxide concentration in the hydrogen-rich gas.

10. A fuel cell system provided with a fuel cell that receives a supply of a fuel gas containing hydrogen and an oxidizing gas containing oxygen, and that obtains an electromotive force through an electrochemical reaction, the fuel cell system comprising:

a fuel gas supply that supplies the fuel cell with the fuel gas, wherein the fuel gas supply is provided with the carbon monoxide concentration reduction apparatus according to claim 9, and supplies the fuel cell with a hydrogen-rich gas whose carbon monoxide concentration has been reduced using the carbon monoxide concentration reduction apparatus as the fuel gas.

~~11.~~ A carbon monoxide selective oxidizing catalyst, comprising:

a carrier whose maximum pore diameter ranges from 0.55 to 0.65 nanometers (nm); and

a metal component supported on the carrier and which includes one of platinum (Pt) alone and platinum (Pt) and at least one type of transition metal, wherein when the carbon monoxide selective oxidizing catalyst receives a supply of a hydrogen-rich gas containing carbon monoxide, the carbon monoxide selective oxidizing catalyst promotes a carbon monoxide selective oxidizing reaction that oxidizes the carbon monoxide by giving the carbon monoxide priority over hydrogen.

12. A carbon monoxide selective oxidizing catalyst according to claim 11, wherein the carrier is a solid acid.

13. A carbon monoxide selective oxidizing catalyst according to claim 11, wherein the transition metal is at least one type of metal selected from the group consisting of iron (Fe), nickel (Ni), cobalt (Co), manganese (Mn), copper (Cu), ruthenium (Ru), chromium (Cr), palladium (Pd), rhodium (Rh), and iridium (Ir).

14. A carbon monoxide selective oxidizing catalyst according to claim 13, wherein the transition metal is iron, and a molar ratio value between a platinum content in a solution used for supporting the platinum on the carrier and an iron content in a solution used for supporting the iron on the carrier ([Pt]/[Fe]) is 1.5 to 7.5 when the carbon monoxide selective oxidizing catalyst is manufactured.

15. A carbon monoxide selective oxidizing catalyst according to claim 14, wherein the molar ratio value ([Pt]/[Fe]) is 2 to 6.

16. A carbon monoxide selective oxidizing catalyst according to claim 15, wherein the molar ratio value ([Pt]/[Fe]) is about 4.

17. A carbon monoxide selective oxidizing catalyst according to claim 11, wherein the carbon monoxide selective oxidizing catalyst is subjected to a reduction processing before being used in order to promote the carbon monoxide selective oxidizing reaction after the metal component has been supported on the carrier.

18. A carbon monoxide selective oxidizing catalyst according to claim 17, wherein the reduction processing is performed at a temperature higher than a temperature of the hydrogen-rich gas used for the carbon monoxide selective oxidizing reaction.

19. A carbon monoxide selective oxidizing catalyst according to claim 17, wherein the reduction processing is performed at 150 to 370°C.

20. A carbon monoxide concentration reduction apparatus, comprising:

a hydrogen-rich gas supply that supplies the hydrogen-rich gas;

an oxygen supply that supplies oxygen used for oxidizing the carbon monoxide;

the carbon monoxide selective oxidizing catalyst according to claim 11; and

a carbon monoxide selective oxidizing reactor that includes the carbon monoxide selective oxidizing catalyst and receives a supply of the hydrogen-rich gas and the oxygen from the hydrogen-rich gas supply and the oxygen supply, respectively, to selectively oxidize carbon monoxide contained in the hydrogen-rich gas through the carbon monoxide selective oxidizing reaction, wherein:

the carbon monoxide concentration reduction apparatus oxidizes the carbon monoxide contained in the hydrogen-rich gas, thereby reducing a carbon monoxide concentration in the hydrogen-rich gas.

21. A fuel cell system provided with a fuel cell that receives a supply of a fuel gas containing hydrogen and an oxidizing gas containing oxygen, and that obtains an electromotive force through an electrochemical reaction, the fuel cell system comprising:

a fuel gas supply that supplies the fuel cell with the fuel gas, wherein the fuel gas supply is provided with the carbon monoxide concentration reduction apparatus according to claim 20, and supplies the fuel cell with a hydrogen-rich gas whose carbon monoxide concentration has been reduced using the carbon monoxide concentration reduction apparatus as the fuel gas.

22. A carbon monoxide selective oxidizing catalyst that receives a supply of a hydrogen-rich gas containing carbon monoxide and promotes a carbon monoxide selective oxidizing reaction that oxidizes the carbon monoxide by giving the carbon monoxide priority over hydrogen, wherein

the catalyst is provided with a metal component including one of platinum (Pt) alone and platinum and at least one type of transition metal, and achieves a carbon monoxide reduction rate of at least 90% when the carbon monoxide selective oxidizing reaction is performed under following conditions (a) through (c):

(a) contents of components other than hydrogen in the hydrogen-rich gas are as follows: a carbon monoxide concentration is about 5000 ppm; a carbon dioxide concentration is about 25%; and an oxygen content is such that a molar ratio value between oxygen atoms and carbon monoxide molecules ([O]/[CO]) is 1;

(b) a space velocity is about 22000h^{-1} when the hydrogen-rich gas is supplied onto the carbon monoxide selective oxidizing catalyst; and

(c) a reaction temperature is 130°C.

23. A carbon monoxide selective oxidizing catalyst according to claim 22, wherein the carbon monoxide reduction rate of at least 98% is achieved when the carbon monoxide selective oxidizing reaction is performed under the conditions (a) through (c).

24. A method of manufacturing a carbon monoxide selective oxidizing catalyst that receives a supply of a hydrogen-rich gas containing carbon monoxide and promotes a carbon monoxide selective oxidizing reaction that oxidizes the carbon monoxide by giving the carbon monoxide priority over hydrogen, comprising:

preparing a carrier consisting essentially of one of ferrierite and ZSM-5; and

supporting on the prepared carrier, a metal component which includes one of platinum (Pt) alone and platinum and at least one type of transition metal.

25. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 24, wherein the transition metal is at least one type of metal selected from the group consisting of iron (Fe), nickel (Ni), cobalt (Co), manganese (Mn), copper (Cu), ruthenium (Ru), chromium (Cr), palladium (Pd), rhodium (Rh), and iridium (Ir).

26. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 25, wherein the transition metal is iron, and a molar ratio value between a platinum content in a solution used for supporting the platinum on the carrier and an iron content in a solution used for supporting the iron on the carrier ([Pt]/[Fe]) is 1.5 to 7.5 when the metal component is supported on the carrier.

27. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 26, wherein the molar ratio value ([Pt]/[Fe]) is 2 to 6.

28. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 27, wherein the molar ratio value ([Pt]/[Fe]) is about 4.

29. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 24, further comprising:

performing reduction processing on the carbon monoxide selective oxidizing catalyst after the metal component has been supported on the carrier.

30. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 29, wherein the reduction processing is performed at a temperature higher than a temperature of the hydrogen-rich gas used for the carbon monoxide selective oxidizing reaction.

31. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 29, wherein the reduction processing is performed at 150 to 370°C.

~~32.~~ A method of manufacturing a carbon monoxide selective oxidizing catalyst that receives a supply of a hydrogen-rich gas containing carbon monoxide and promotes a carbon monoxide selective oxidizing reaction that oxidizes the carbon monoxide by giving the carbon monoxide priority over hydrogen, comprising:

preparing a carrier whose maximum pore diameter ranges from 0.55 to 0.65 nanometers (nm); and

supporting on the prepared carrier, a metal component that includes one of platinum (Pt) alone and platinum and at least one type of transition metal.

33. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 32, wherein the carrier is a solid acid.

34. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 32, wherein the transition metal is at least one type of metal selected from the group consisting of iron (Fe), nickel (Ni), cobalt (Co), manganese (Mn), copper (Cu), ruthenium (Ru), chromium (Cr), palladium (Pd), rhodium (Rh), and iridium (Ir).

35. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 34, wherein the transition metal is iron, and a molar ratio value between a platinum content in a solution used for supporting the platinum on the carrier and an iron content in a solution used for supporting the iron on the carrier ([Pt]/[Fe]) is 1.5 to 7.5 when the metal component is supported on the carrier.

36. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 35, wherein the molar ratio value ([Pt]/[Fe]) is 2 to 6.

37. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 36, wherein the molar ratio value ([Pt]/[Fe]) is about 4.

38. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 32, further comprising:

performing a reduction processing on the carbon monoxide selective oxidizing catalyst after the metal component has been supported on the carrier.

39. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 38, wherein the reduction processing is performed at a temperature higher than a temperature of the hydrogen-rich gas used for the carbon monoxide selective oxidizing reaction.

40. A manufacturing method for a carbon monoxide selective oxidizing catalyst according to claim 38, wherein the reduction processing is performed at 150 to 370°C.